The Influence of Dark Patterns on User Behavior: Evaluating Social Media Design Choices

Childhood in the Digital Age: The Gap Between Technology and Culture

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

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November 10, 2024

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

In 2000, 52% of U.S. adults reported using the internet, a figure that rose to 76% by 2010 and 95% today (2023). As the internet becomes more integral to how Americans receive information and connect with others, nine in ten adults report going online daily, with four in ten indicating near-constant connectivity (Pew Research Center, 2024). While these digital settings offer numerous benefits, they often employ smart, adaptable systems designed to maximize commercial interests, retain users' attention, and predict and influence future behavior (Kozyreva et al., 2020). These systems often manipulate or influence users in ways that compromise their health and well-being, frequently using persuasive design techniques. Vizcaino et al.'s 2020 study found that individuals with high screen time (around 17.5 hours per day) reported lower levels of physical activity, self-rated health, hours and quality of sleep, along with higher perceived stress and poorer dietary habits. In my technical paper, I will examine how persuasive design elements in online environments contribute to increased engagement and overall screen time.

Not surprisingly, younger age groups are more connected than their older counterparts, with 62% of internet users ages 18-29 reporting near-constant use (Pew Research Center, 2024). This trend raises concerns about the impact on children exposed to the internet at an early age, who may be more susceptible to persuasive design tactics, especially as digital tools become integral to education. Research by Twenge and Campbell (2018) found that higher daily screen time in children ages 6-10 was associated with a 20-30% decrease in curiosity, social ease in making friends, ability to stay calm when challenged, task completion, and increase in likelihood of arguing. In my STS research paper, I will examine both the intended and unintended effects of integrating technology into early childhood, shaping not only individual habits but also the

broader culture of childhood. As digital technology reshapes daily interactions, this research will highlight public health concerns and their impact on a generation raised in an immersive digital environment, aiming to reduce users' blind trust in technology—a trust often driven by a technocratic belief that can leave them more vulnerable to potential negative effects.

Technical Topic

In well-designed interfaces, users are intuitively guided to interact with products effectively, with gentle persuasion encouraging correct usage. Social media platforms, in particular, can foster a sense of community and provide valuable information in an online environment. However, these applications are also engineered to maximize business interests, often exploiting subconscious psychological triggers to keep users engaged as long as possible, regardless of whether the interactions are positive or negative. The line between ethical and exploitative persuasion through design is blurred. In this context, exploitative persuasion refers to user interface designs and features that compromise users' autonomy by manipulating their attention and influencing their long-term decision-making. These features will be referred to as dark patterns. Building on Kozyreva et al.'s identified digital challenges (2020), this also includes the use of false or misleading information, tactics that steer user behavior toward commercial interests, and practices designed to commodify human attention. These techniques are difficult to regulate, as social media interactions vary widely among users depending on individual psychological processes and emotional states. The central problem, however, is that most users remain largely unaware of these underlying techniques and their potential effects, often engaging with platforms from a place of trust rather than skepticism, leaving users vulnerable to exploitation.

My technical project involves evaluating and comparing the ten most popular social media platforms in the US: Youtube, Facebook, Instagram, Pinterest, Tiktok, LinkedIn, WhatsApp, Snapchat, X (formely Twitter), and Reddit (Pew Research Center, 2024). They will be given a score based on the number of dark patterns implemented and the extent they are implemented. The dark patterns chosen focus on the aspects that influence users to spend more time on the application or online than intended and are compiled from Kozyreva, Lewandowsky, and Hertwig (2020). Specifically, the project will examine features that create a sense of urgency, such as notifications or countdowns, use misdirection, such as visuals, language, or emotion steering users away from making particular choices, leverage social proof by influencing behavior through highlighting the experiences and behaviors of others, and enforce forced action by requiring account creation before accessing content. Additionally, Khan's study on user engagement with YouTube (2017) provides valuable user motivations for content consumption and interaction, categorizing them into information seeking, giving information, self-status seeking, social interaction, and relaxing entertainment. These categories extend beyond YouTube, capturing core reasons users gravitate toward online environments. By examining how specific user interface elements tap into these motivations, we can better understand how they influence user behavior.

This project aims to reveal how design choices in social media impact user's autonomy, highlighting the intentional influence of user interface elements. By uncovering these techniques, I hope to raise awareness, helping users better recognize and mitigate the subtle manipulations embedded in these platforms. Through enhanced informational literacy and cognitive resilience, individuals can make more informed choices and avoid the potential exploitation and negative effects tied to dark patterns.

STS Research Topic

The rapid development of portable and instantly accessible technology, such as smartphones and digital tablets, has significantly increased the time children spend using digital devices (Hosokawa & Katsura, 2018). For example, I've seen first-hand how 4th grade students are assigned digital homework, requiring device access and basic proficiency in using internet-connected tools. Among elementary children (ages 6-10), higher screen time is associated with challenges such as difficulty finishing tasks, staying calm when faced with challenges, and maintaining curiosity or interest in learning new things, especially when compared to older children aged 11-17 (Twenge and Campbell, 2018). In elementary classrooms (kindergarten through sixth grade), students are developing essential skills in reading, writing, math, language, and social interactions, typically under the guidance of a single teacher. As digital tools become increasingly integrated into these educational settings, it is crucial to examine both their intended benefits and unintended consequences. While technology can support learning, it also poses potential risks to traditional educational goals and child development. For the purposes of this discussion, digital tools are defined as devices that connect to the internet, as well as digital platforms or offline tools, such as interactive games, that facilitate digital interaction. Without a comprehensive understanding of the impacts of technology integration in early childhood, children may face risks such as underdeveloped academic and social skills and the formation of unhealthy habits both in and beyond internet use.

This sociotechnical issue will be examined from two primary perspectives: first, by identifying the various ways digital tools are integrated into children's daily lives (creating a typology of use), and second, by assessing how these tools influence key relationships,

particularly between child and parent, child and teacher, and child and peers. This dual approach will provide a comprehensive understanding of how digital tools shape learning and development, while also exploring their broader social implications for children growing up in a digital age. Furthermore, this analysis will offer insight into the latent and manifest functions and dysfunctions (Merton, 1968) of a digital childhood.

This research will compare key aspects of childhood development historically and in today's digital age, drawing on peer-reviewed sources to trace how developmental processes have evolved over time (Haleem et al., 2022). This approach will clarify the role of digital tools in supplementing or, at times, replacing traditional developmental practices. It will also examine guidance provided to teachers on integrating digital tools that foster student engagement and creativity, weighing both the benefits and the potential challenges. For instance, Bacak (2022) highlights concerning cases of inappropriate behavior and internet misuse among students. Furthermore, by building on findings from Barkhuus and Lecusay (2012), which suggest that poorly designed technology can disrupt educational frameworks in after-school programs, this research will explore the cultural structures and norms necessary to support responsible and effective digital use among children.

Since much of the research is based on adult-reported data (for example Griffith, Delisle, and Casanova's study about parent perceptions of children behavior), I will review studies and surveys that capture children's own views of the Internet. For instance, Çetintaş and Turan (2018) demonstrate that many children lack digital literacy, frequently encountering inappropriate online content without recognizing its potential risks. I also aim to investigate how digital devices shape or influence interactions among peers, examining the social dynamics and developmental impacts of technology on peer relationships. This insight into children's

perspectives provides a basis for understanding how early experiences may shape long-term internet habits. Additionally, this research will explore how parent-child and teacher-child relationships shape children's attitudes and behaviors in a digital context, while also examining how children's digital habits may, in turn, influence their relationships with parents and teachers. By investigating both perspectives, this study will evaluate children's and adults' views on digital device usage, assessing the balance between fostering creativity and cultivating responsible digital practices. Furthermore, it will explore the broader roles of parental and educational oversight in guiding children's technology use and supporting their social development, as well as spotlight demographic risk factors (Sebre et al, 2024).

Conclusion

My technical paper aims to raise awareness of the exploitative design techniques used by social media platforms to capitalize on users' motivations for engagement. My analysis will contribute to a broader understanding of how these design features foster digital dependency and the health effects that may arise from it. By uncovering these mechanisms, my research seeks to empower users to engage more mindfully with technology, encouraging healthier digital interactions.

My STS paper explores the societal implications of introducing digital devices to elementary-aged children, focusing on the gap between the anticipated benefits and the actual outcomes observed in their learning and development. I will investigate the intended uses of technology, its potential positive and negative effects, and examine the boundaries that can help mitigate associated risks. This research contributes to the growing conversation around

responsible technology use, underscoring the need for critical evaluation and a balanced approach to adult involvement in managing technology's role in children's lives.

Together, these papers address the overarching sociotechnical problem of digital technology's rapid advancement outpacing society's readiness to adapt responsibly. This research emphasizes the responsibility of technology creators and designers to prioritize ethical considerations, ensuring that their innovations support users' well-being and development, particularly for children accessing digital platforms. By combining insights from both the technical and social dimensions, my research highlights the use of responsible digital devices without compromising well-being or development trajectory and approaching technology integration from a place of skepticism, rather than optimistic trust.

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